

AUGUST 5, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Atoms in Industry

See Page 91

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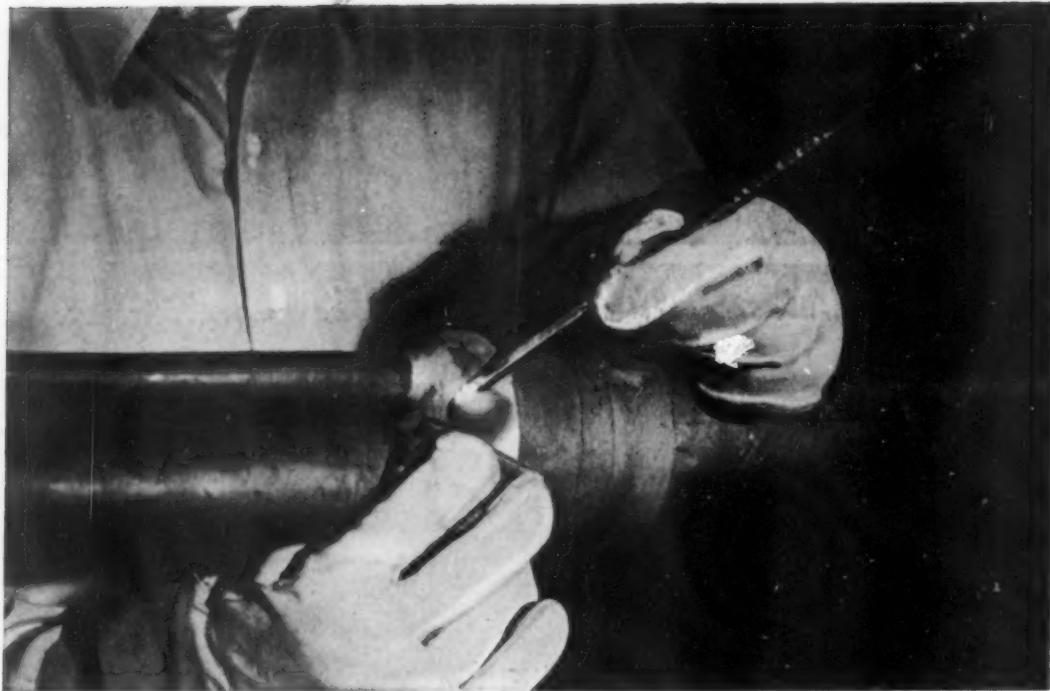
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*He seals out
trouble...*

**TO KEEP THE COST
OF YOUR TELEPHONE
SERVICE DOWN**

To make cable joints tight and strong, splicers formerly used lots of solder. Then, Bell Telephone Laboratories developed a new technique for making better joints with much less solder. This saves one million pounds of solder a year—helps keep the price of your telephone service low.

Two kinds of solder are now used. One makes the splice strong; the other seals it. First, the splicer builds up a joint with a solder of lead and tin, which flows easily under his wiping cloth. To seal the joint, he applies a light coating of low-melting-point solder, composed of lead, tin and bismuth. On contact with the still hot joint, it flows into and seals every pore.

Cable-sealing solder is only one of 30 low-melting-point alloys which Bell metallurgists have developed for special uses—in fuse wires, for example, and in the solder connecting hair-like wires to piezoelectric crystals for electric wave filters.

Continuing research with a substance seemingly as commonplace as solder demonstrates again how Bell scientists help keep your telephone service the world's best.

BELL TELEPHONE LABORATORIES



• WORKING CONTINUALLY TO KEEP YOUR TELEPHONE
SERVICE BIG IN VALUE AND LOW IN COST

NUCLEAR PHYSICS

"Death Sand" Kills Subtly

An invisible death sand which is made by drying fission product salt solutions on sand or metal powder kills quietly. However, use of this weapon would be difficult.

► AN INVISIBLE dust of radioactive "death sand" could spread over cities of the earth and kill their populations by radioactivity without the noisy warning of an atomic bomb.

This specter of radioactive poisons is raised again by Dr. Louis N. Ridenour, dean of the University of Illinois Graduate School, in a report appearing in the BULLETIN OF THE ATOMIC SCIENTISTS.

Citing a brief paragraph in the famous Smyth report of 1945 and an Austrian discussion of 1948 by Dr. Hans Thirring, the present analysis concludes that insidious use of the fission products of nuclear reactors would be a difficult weapon to use because of delivery to the target, chemical separation of the poisons and amounts available (enough for only two or three major cities a month).

This use of radioactive poisons in warfare is different from the radioactivity produced by atomic bomb explosions, whether the radiation of the bomb itself, the induced radioactivity in materials of the target city, or in chemical elements placed in the bomb to produce enhanced radioactivity.

What would be done would be to collect the debris of smashed uranium atoms from atomic "furnaces" in which fissionable material is being "burned." About a dozen of these products would be useful in warfare. These emit beta rays (electrons) or gamma rays of substantial energy, and half of their substance would be disintegrated in periods from about a week to a year.

Very fine sand would be coated with these radioactive poisons and spread very thinly over the area where it is desired to wipe out life.

The person in a poisoned area has no way of knowing that he is in danger either by the evidence of his senses or by any unsophisticated tests. He may receive a lethal dose of radiation before he knows that he is endangered, and yet a few days later he may die. Radioactivity detectors would tell of the danger. If a person is aware of the danger he may survive if he flees the area at once with a dampened handkerchief over his nose and mouth. Walls of a sturdy building or even heavy clothing would lower exposure risk, but half an hour of breathing of dust stirred up by passing winds would give a fatal internal dose.

Radioactive "death sand" because of its novel and unique properties may be useful in special situations, but its proper use in war would be very difficult.

The "death sand" is prepared by drying fission product salt solutions on sand or metal powder. It is described as the lightest and most transportable of all the weapons of mass destruction. A highly deadly layer on the surface of the ground would weigh only 12 milligrams per square meter and would be quite invisible.

Secrecy has been clamped down in the United States on any hints about this kind of warfare since 1945, but Dr. Ridenour figures out that enough radioactive fission products are produced each month at the Hanford, Wash., plant to contaminate 144 square miles, or more than six and a half times the area of Manhattan.

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NUCLEAR PHYSICS

Radiological Warfare Agents Spotlighted

► ATTENTION was focussed on radiological warfare agents by a sentence in the

latest (eighth semiannual) report of the AEC to Congress. The sentence merely states that "studies on the feasibility of radiological substances as a method of warfare were continued."

But six months ago Secretary of Defense Louis Johnson reported on the subject in some detail.

"The possibility of radiological warfare is another outgrowth of atomic energy applications for national defense," he stated.

"The objective of this form of warfare would be to make a given area untenable through the presence of radioactive particles, called RW agents."

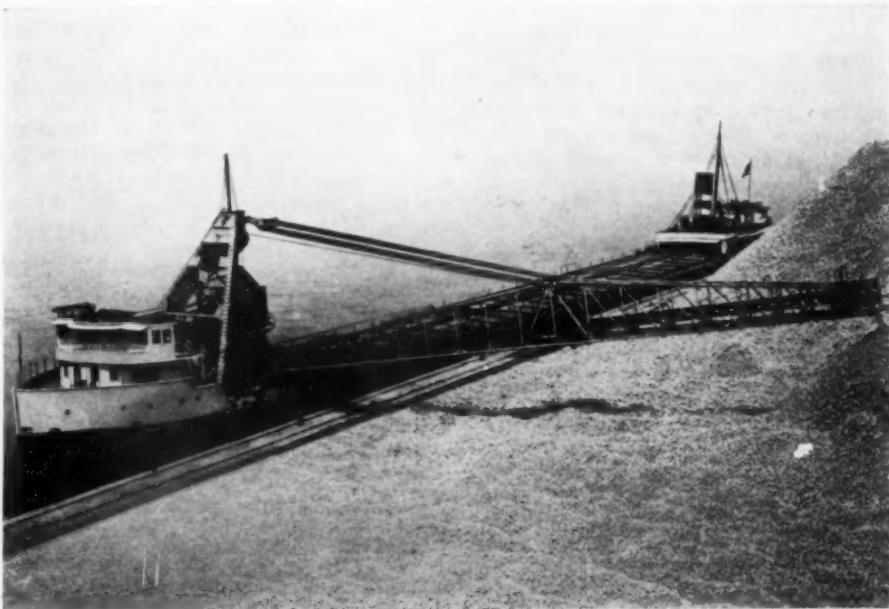
He warned that "every atomic pile of suitable size, irrespective of its design or purpose, is a potential source of significant quantities of RW agents, and RW weapons could become available to another country whether or not they produced an atomic bomb."

At present, RW is a "mystery weapon," he said. It could therefore cause panic unless people are informed about it.

Chief reassurance to those who are frightened by the possibility of RW is his statement that "orderly evacuation from contaminated areas should be possible."

One of the technical problems to be solved before RW could be used is that of separating desired agents from the complex of fission products.

It is not practical now to separate these products, Dr. George G. Brown, director



SELF-UNLOADING SHIP—Ten thousand tons of bulk cargo can be discharged and neatly piled ashore in about five hours, with as few as three men handling the conveyors and, if dock space permits, without assistance of any shore-based equipment. These ships, however, need not be built specifically for self-unloading. Successful conversions have been made of cargo ships that have operated for as long as 30 years by old-fashioned methods of unloading.

of the AEC's division of engineering, stated, adding that it would be difficult to accomplish this but not impossible.

The AEC report consisted largely of

details on measures and devices for protection against radiation injury as practiced in atomic energy plants.

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GENERAL SCIENCE

No Brains List Now

► OUR government has only an incomplete idea of the reserves of scientific brains at its disposal in this emergency. This is because "economy" in 1946 forced the abandonment of a national science roster which, during World War II, provided up-to-date information on all Americans with scientific and technical backgrounds.

Only recently has there been an attempt to recreate the list. Because of the new scientists who have graduated and received advanced degrees and because of the moving around of many other scientists, the old list is practically useless.

Right now the work has been farmed out by the National Security Resources Board to the Office of Education in the Federal Security Agency. The National Academy of Sciences is cooperating in this effort. The job of keeping it up will belong to the new National Science Foundation when it is set up.

The National Research Council has a good list of most of the natural scientists with Ph.D.'s—physicists, chemists, etc. A comparable roster of engineers is being developed and work is just beginning on a roster of the social scientists.

A complete roster will be vitally necessary in a general mobilization. The armed forces, other defense agencies and laboratories working on new weapons must be able to know where to get the scientists they will need and how many with a particular talent are available.

Because we probably will have to use our present supply of scientists carefully, a system of allocating them on the list may soon be set up. There have been rumors that the National Science Foundation, designed as a peacetime agency, will be given this task.

Scientists hope that a reasonable method of allocation of their talents will be worked out. During World War II, some of the scientific societies worked hard to see that men were placed where they would do the most good. Most of this work was concerned with getting around Selective Service System and military establishment blunders in individual cases.

A complete roster of scientific talent, in the opinion of most scientists, is the basis of setting up a system which will make impossible the mistakes of World War II.

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PHYSICS

Radioactive Materials Help Find Best Oils

► RADIOACTIVE material from the atomic pile at Oak Ridge, Tenn., is playing an important part in Philadelphia in determining the effects of different oils on the wear of automobile engines. The process employed was described by scientists of the Atlantic Refining Company.

These scientists are working with engine parts made radioactive in the atomic pile.

They determine engine wear by measuring the amount of radioactive iron particle in the oil after a test has been run. These iron particles have been worn from the operating engine.

In making tests, the engine need be run for only about three hours. When the test is completed, a metal cylinder containing a Geiger counter is dipped in the oil sample. This instrument immediately records the amount of radioactive particle in the oil.

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Question Box

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GEOLGY

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MEDICINE

What is the medicine given with milk for best results? p. 91.

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MEDICINE

Winter Shots Avert Polio

Babies and children taking diphtheria and whooping cough shots during the summer and early fall are more susceptible to polio.

► TO avoid danger of infantile paralysis, babies and children should not be given "shots" against diphtheria and whooping cough during summer and early fall, when infantile paralysis is likely to appear.

This warning was sounded at the sixth International Congress of Pediatrics in Zurich, Switzerland. It was based on findings of a number of doctors in England and Australia. The baby and child specialists who devoted a special section to this subject considered it one of the most significant of the Congress.

Babies routinely immunized against diphtheria and whooping cough contracted infantile paralysis more often than other children, Drs. Philip R. Evans and J. Kenneth Martin of Guy's Hospital, London, and Dr. B. P. McCloskey of Adelaide, Australia, discovered independently in the summer of 1948.

The paralysis, these doctors found, nearly always affected the arm or leg where the "shots" had been given.

The presumption is that had it not been for these "shots" the poliomyelitis virus might have produced either no visible disease or else non-paralytic disease. The injections, however, lowered the resistance of the child locally, that is, in the arm or leg, or else set up conditions favorable to the local multiplication or spread of the virus, resulting in local paralysis.

Dr. Martin who has moved to Winnipeg, Canada, confirmed these findings last summer in that Canadian city.

A statistical analysis of the findings which indicates they are highly significant has been made by Dr. Bradford Hill, in England.

Dr. Martin was at first very hesitant to report his findings, fearing that they would stop people from having children and babies immunized against diphtheria and whooping cough. This would be bad because both diphtheria and whooping cough are much more likely to kill than infantile paralysis. They are also likely to attack many more children when the immunizing "shots" are not given.

Dr. Evans and others at the Congress feel that the net result of the findings should be merely to change the time when these protective immunizations are given, so that they are not given during summer and early fall, the polio season, or at any time when polio is prevalent in the community.

Smallpox vaccination does not seem to produce the predisposition to paralytic polio

attributed to diphtheria and whooping cough immunizations.

Reports on the link between polio and whooping cough and diphtheria immunizations were given by Dr. Evans and Dr. W. H. Geffen of St. Pancras Hospital, London.

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ENTOMOLOGY-CHEMISTRY

Chemical Dust Jacket for Grains Kills Insects

► CHEMISTRY has come up with a new weapon against a public enemy now costing the U.S. about \$500,000,000 a year.

One-shot chemical treatment of a grain elevator or storage bin, giving protection for an entire season against the weevils, beetles and other pests which ruin up to 10% of the nation's grain crop after it has been harvested, was announced by U.S. Industrial Chemicals, Inc.

The treatment is built around a relatively new insecticide called pyrenone. For wheat protection, the chemical firm mixes this compound with fine wheat dust; for other grains, with fibrous talc, a finely-ground mineral.

Applied to grains as they go into storage, these dusts cling to the kernels. The insect-proof vests they provide have been shown in extensive tests to last as long as nine and a half months. Yet the insect-killing ingredient in the dust, a chemical called piperonyl butoxide, is completely harmless to humans or animals. Thus it may be used with safety in grains headed for the flour mill or the feed trough.

Until now the only insect control available for stored grain has been fumigation. This gives a good kill of insects already in the grain, but offers no protection for infestations a week later.

The U.S. Department of Agriculture is currently testing the new compounds at its insect laboratory in Manhattan, Kans. Government officials said the new product has a huge potential market, running to many millions of dollars.

This year U.S. Industrial Chemicals will have only limited quantities of its new insecticides available. But as production increases, prospects for the familiar weevil and his billion-dollar appetite will take a decided turn for the worse.

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WEEVILS AT WORK—The insects lay their eggs in the holes bored into the kernels, which are tiny pinpoints to the naked eye. The snow-like residue on this untreated grain is left by the insects. Treatment with pyrenone would prevent such havoc as this.

ASTRONOMY

Earth Formation Theory

The evolution of our present solar system is traced. Due to the weakness of gravitational forces, gases from the original cloud escaped, the particles forming a solid mass.

► HOW the earth and planets were formed was described in Berkeley in a new theory by Dr. Wendell Latimer of the University of California.

The chemical reactions accounting for the evolution of the solar system are set forth in the general framework of theories that have gained wide favor among both astronomers and geologists.

Dr. Latimer states the steps by which the earth and planets developed into their present form from a great, cold cosmic cloud. He also accounts for the elimination of gases from the cold cloud—a big stumbling block in cosmology.

While the cosmic cloud was still diffuse and in the early stages of condensation, Dr. Latimer proposes, it broke up into smaller clouds from which the earth and planets were formed.

The particles of the earth cloud, at that time about 10,000 times larger than is the earth today, were of a varying weight. Because gravitational forces were so weak, the gases in the cloud escaped from the cloud. Then the particles fell together to form a solid mass.

Because of the variations in weight, the particles fell together at different velocities. So the metals, being the heaviest, tended to be at the center of the earth mass, with the lighter silicates and basalt particles on the outer layers.

Thus, when the earth was originally

formed, says Dr. Latimer, it was cold and had no appreciable atmosphere, water or continents. He reported his theory in the journal, *SCIENCE* (July 28).

But in this earth mass there was a lot of potassium, uranium and other radioactive materials. The heat provided by this radioactivity was enough to raise the temperature of the earth's surface to 2000 degrees centigrade 1,500,000 years after condensation of the cloud. The radioactivity-produced heat was also the source of the energy for chemical reactions which created the atmosphere, water, continent and mountains of the earth.

For example, decomposition of basalt into granite and dunite, the latter being among the very heavy rocks of the earth, was responsible for the building of continents and mountains. The heavy dunite sank to lower levels, the granite rising.

Water was formed by the breaking down of water-containing silicates and aluminates. Carbon dioxide was formed by the reaction of iron oxides with carbides, and a sequence of reactions provided hydrogen and nitrogen for the atmosphere. Oxygen was added later through photosynthetic processes.

Dr. Latimer estimates that about half of the solid particle material of the universe has been condensed into planets and stars. The remainder, in great cosmic clouds in space, is the stuff of which new inhabitants of the expanding universe are being formed.

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MEDICINE

Smooth Medical Service

Korean forces are backed up by an efficient and well operated medical service. Each company now has four aid men instead of the two it formerly had.

► BACKING our fighting forces in Korea is the most efficient, smooth-working rescue operation that has ever existed in history. It is known as the Army Medical Service and it celebrated its 175th birthday the week of July 27.

The unbroken chain of mercy operated by this service from the front line to gigantic military hospitals in the United States has been strengthened in several ways since World War II.

Right at the front, when a wounded man calls "Medic," there are twice as many aid men to answer his call and help him.

Each company now has four instead of two of these aid men to put on splints, give morphine to ease pain and start the wounded GI back to shelter and waiting doctors and nurses.

When he has been carried by litter, ambulance or jeep litter as far back as the division clearing station, he will find another of the strengthened links in the chain of mercy. This is the mobile surgical hospital, a new unit since World War II. At this point major surgery can be performed for those wounded who cannot be transported any farther without such care. From

this point the wounded are moved to evacuation hospitals and thence flown to large hospitals in Japan.

Wounded who will require 120 days or longer to recover are being flown back to the United States. The others can be cared for at the hospitals the Army has in Japan.

New drugs for fighting the diseases our troops will encounter in Korea and for stopping infection in wounds add further strength to the chain of mercy.

For malaria, one of the two chief disease dangers in Korea, there is chloroquine. A tablet taken once a week does the work of the skin-yellowing daily tablet of atabrine did in World War II.

Landing parties and troops transported by air will not arrive too seasick or airsick to fight, thanks to dramamine.

Against scrub typhus, a potential threat in Korea, the Army has chloromycetin whose value was proved by Army doctors in tests in Kuala Lumpur since World War II.

And there is a new vaccine against Japanese B encephalitis, a disease that attacks brain and central nervous system.

Besides malaria, the chief disease threats our troops face in Korea are dysentery and diarrhea. Protection against these, as against malaria, depend chiefly on self-discipline on the part of the GI's who must stick to safe water for drinking and bathing, take the chloroquine tablet regularly and take precautions against mosquitoes whenever possible. Mosquito control units are operating in Korea.

Theater Surgeon Maj. Gen. Edgar Erskine Hume expects neuropsychiatric cases to be above normal because of the type of military operation in Korea.

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ARCHAEOLOGY

"Light" for Cigarette Is Clue to Oldest Village

► WHEN a village sheik in Iraq used a flint and steel to light a cigarette offered by an archaeologist it furnished the clue which led to the unearthing of the oldest known village site, about 7,000 years old.

It turned out that the flint, one of many which have been found on a nearby mound of Jarmo, was a product of the late Stone Age.

An expedition will soon set out under the direction of Prof. Robert J. Braidwood, of the University of Chicago's Oriental Institute, to explore the Jarmo site. The oldest known row houses may be found here.

Bones unearthed at Jarmo during a preliminary study of the site showed that the people of this ancient village raised crops and had domesticated animals.

The site was dated by the very modern "atomic calendar" developed as a by-product of atomic bomb studies. Measurement of the amount of radioactive carbon 14 found in snail shells from the site showed it to be about 7,000 years old.

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METEOROLOGY

From Now On: Weather

Long range weather forecasts will chart weather far in advance with techniques of the future. The cold and warm years may also be predicted.

By WATSON DAVIS

Nineteenth in a series of glances forward in science.

► THE day has long since passed when a farmer or a business man went to a patent medicine almanac for his weather forecast. He now reads the daily forecast in his newspaper, checks changes in predictions hour by hour by telephone or radio, and governs his work and pleasure accordingly.

The airplane pilot has his flight path determined for him by the airport meteorologist. Thanks to a vast world system of weather reports, almost every place knows the weather of every other place as it happens.

A couple of decades ago trying to foresee what was going to happen in the earth's atmosphere—what we call "weather"—was largely a two-dimensional activity. The weather men knew only what was happening at the surface of the earth. Now weather forecasting is three-dimensional and highly dynamic. Air masses as they rush over the surface of the earth are followed and pictured on the weather map hour by hour.

Temperature, humidity, barometric pressure, wind and precipitation of various sorts are still some of the basic physical factors that the meteorologist uses. Supplementing the conventional observations of the ground level, balloons carry automatic self-supporting weather stations aloft for many miles upward, radar follows thunderstorms and airplanes make routine but astounding flights over areas such as the North Atlantic where permanent weather observation points are lacking. With a better picture of the circulation of the earth's atmosphere and the course of storms, the meteorologists have been able to extend their forecasts as to what will happen weatherwise in a given locality as far ahead as three or four days or a week.

For a broad area, such as a state or a section of the country, much more extended forecasts, looking forward to what will happen in the way of rainfall and temperature, are now being made public by the United States Weather Bureau. For example, this spring's unseasonably cold weather along the east coast was predicted a month in advance by this new service.

Some study is being directed toward intelligent guesses as to whether seasons will be normal or abnormal. Obviously, these must be experimental and hazardous because it takes so long in time to test the applicability of many complex factors.

The weather has so much to do with how

much food the farmers of the world will raise that our weather men may eventually even warn us of bad harvests ahead, or the probability of dangerous agricultural surpluses in our future.

For the sorrier business of a fighting war, weather forecasts could determine when bombers should fly, troops make their landing, and atomic weapons spray their death. For weather is a weapon.

Whether we can do anything about making our own weather, particularly rain, is still problematical. By spraying clouds with rain-promoting particles, it seems possible to give nature's processes a bit of a push at least under certain relatively infrequent conditions. There are threats already in some areas of legal action to protect the water resources of the upper atmosphere. Today some people spray for rain instead of pray for rain.

The energies involved in a large storm are so immense that any artificial methods of changing major air movements seem fantastic.

Predicting meteorology's future in the coming years:

A. Forecasts of general weather a month and more ahead will become bolder and more accurate with increasing experience and will be used more extensively for planning many human activities affected by the weather.

B. Watching the weather from hour to hour will become even more effective than today's high precision, with the possibility that even the swift and uncertain course of tornadoes may be determined by radar and other means in time to warn of the danger.

C. The cold years and the warm years that are brought by gradual cyclical shifts of climates may be determined in order to give us long-range notice of unusual heat, cold and drought.

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ENGINEERING

Oil Progress in Pipeline Controlled Automatically

► THE progress of petroleum products flowing through a 450-mile pipeline in the Midwest can be noted and controlled in New York with equipment in the offices of the Shell Oil Company. The progress is recorded on a 17-foot control board.

The pipeline extends from a Shell refinery near St. Louis to Lima and Columbus, Ohio. The secret is a series of stations

along the line in which pumps are equipped electrically so that they may be started or stopped and valves opened or shut, using remote control by wire from the central office.

Code numbers on a telephone dial attached to a teletype machine do the job. The equipment in the pumping stations automatically reports on operating conditions. A set of meters reports to New York by teletype the suction and discharge pressures and electrical load of each station whenever the New York operator dials particular numbers on his teletype.

This pipeline, unlike those that carry only one product, is equipped so that it can handle one after another as many as 22 different finished petroleum products. Such products as gasoline, naphtha, kerosene and fuel oil can be pumped into the line, following each other through. At convenient intervals, a portion of any product can be taken out and put in tanks for distribution to local customers.

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● R A D I O

Saturday, August 12, 3:15 p.m. EDST

"Adventures in Science" with Watson Davis, director of Science Service over Columbia Broadcasting System.

Dr. William Menninger, general secretary, and Dr. Karl Menninger, director of education, Menninger Foundation, Topeka, Kans., will discuss "The Mind and Research".



KEEPING TAB—A 17-foot control board in Shell's New York office traces the progress of every gallon of oil product in the 450-mile pipe line in the midwest. Shell dispatchers set markers and adjust charts to show exactly where each product is, 24 hours a day. Products move through the line at about 4 miles an hour.

MEDICINE

Find Virus Cause of Infant Diarrhea

► DISCOVERY of a virus believed to be one cause of epidemics of diarrhea among newborn babies was announced to the Sixth International Congress of Pediatrics in Zurich, Switzerland, by Dr. Horace L. Hodes, pediatrician in chief at Mount Sinai Hospital, New York.

The virus was found in outbreaks of diarrhea among newborn babies on four different occasions in two hospitals in Baltimore, Md., and Washington, D. C.

Dr. Hodes does not suppose that this virus is the cause of all the outbreaks of diarrhea which sweep through hospital nurseries, sickening and often killing new babies. But apparently it is the cause of some and perhaps many of these epidemics.

In studies with Dr. Jacob S. Light, Dr. Hodes found that this virus would regularly produce diarrhea in young calves. The virus can perpetuate itself, multiplying in the animal's body.

Further evidence that the virus which caused the disease in calves was the one that made the babies sick came when Drs. Hodes and Light injected blood serum from two babies who had recovered from the epidemic diarrhea into two calves. This serum completely protected the calves from the infection, and the serum from two more recovered babies partially protected another two calves.

Material from stools of eight normal infants caused no disease in calves.

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AERONAUTICS

Faster than Sound Missiles Studied

► A NEW scheme to study the behavior of airplanes and missiles traveling faster than sound utilizes a tiny model of the object which is shot from a gun through very cold gas. In such a gas, sound waves travel relatively slowly.

The speed of sound is approximately 760 miles an hour at sea level under ordinary conditions, but in a dense gas, obtained by cooling, it is less. In this method very low sonic velocities are obtained by cooling the gas to very low temperatures, using liquid nitrogen.

This method was employed at the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics and found successful. A report issued in Washington by the NACA states that the practicability of increasing the Mach number of a model by refrigeration of the test medium is established.

Mach number is the ratio of the speed of the object to the speed of sound. A Mach number of 6.7 was obtained in these

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tests. This means the velocity of the model used was 6.7 times the speed of sound in the highly cooled gas used.

In the investigation, a commercially available 22-caliber high velocity gun was used to obtain velocities of some 4,200 feet per second. The chamber was filled with nitrogen gas. The low-temperature chamber was composed of two cylindrical compartments, one within the other. The cooled test gas was contained within the inner cylinder.

Focused shadowgraphs were taken through windows. They are known as schlieren photographs and show the shock waves about the model. Twin photocells operated the equipment to record the time required for the model to traverse the space between the cells.

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MILITARY SCIENCE

Light Tanks without Armor for Future

► LIGHT tanks without armor—or with very little armor—that can move fast over rugged terrain may one day replace the lumbering, almost road-bound 35- to 60-ton tanks in our armed forces.

This is the conclusion of Col. Hamilton H. Howze, now on duty with the Army General Staff, in an article in the COMBAT FORCES JOURNAL (August).

"Granting that the tank has lost much of its ability to plow through shot and shell (an ability that was always much overestimated)," he said, "it may gain a more than compensating mobility and destructive power."

Col. Howze wrote his article to the question: "Is the tank a dead duck?" He answered that with another question: "Is mobility obsolescent?"

"When the gasoline engine was developed," he pointed out, "the horse became obsolescent—but only because the motor could do the job better. It follows then that so long as the motor is capable of propelling a vehicle that can carry effective guns and heavy loads of ammunition—and other destructive devices—to and about the battlefield, there will be the greatest demand for its services. Only the shape of the vehicle will be changed."

New anti-tank weapons like the 3.5 bazooka, he intimated, far from outmoding the tank, serve only to influence its design and change its tactics. The new tank must learn to avoid the hit, rather than absorb it, and must improve its ability to kill. Barring radical improvements in armor, the tank cannot hope to wall itself off from projectiles.

"There is no weapon that presents a more challenging prospect," he concluded, "than tanks do for those of us who are willing to throw off the restrictions of the past."

Science News Letter, August 5, 1950

IN SCIENCE

CHEMISTRY

Carbon Dioxide from Coke with Iron Ore

► A NEW method of making carbon dioxide for use as dry ice and in soda pop and fire extinguishers has been developed in Cambridge at the Massachusetts Institute of Technology. It is a short cut over older methods and results in pure carbon dioxide directly by reacting coke with iron ore.

In the process, powdered coke and ore are mixed together and form a "fluidized powder" by means of a stream of pure carbon dioxide blown through them. The process is somewhat similar to one employed in the petroleum industry where a fluidized material is used as a catalyst in the refining process. The material is not actually a fluid but, because finely divided and kept alive by the current of gas, acts somewhat like a fluid.

In this new method of making carbon dioxide the mixture of coke, iron ore and gas bubbles like a liquid. The coke is converted to carbon dioxide by taking the oxygen from the iron ore. The resulting gas is drawn off and the ore, stripped of its oxygen, is regenerated with oxygen from the air and used over again.

Usually carbon dioxide is made by burning coal, giving a mixture of the desired gas with nitrogen from the air. The resulting mixture has to be treated with chemicals to absorb the carbon dioxide, and the fizz gas is then obtained by heating.

The new process was developed by W. K. Lewis, E. R. Gilliland and M. P. Sweeney of the M. I. T. staff. It was described by them at a regional meeting of the American Institute of Chemical Engineers held in Cambridge.

Science News Letter, August 5, 1950

AGRICULTURE

Hybrid Sugar Cane Is Tailored for Machine Age

► HYBRID sugar cane tailored to the machine age was unveiled recently by the Department of Agriculture, Louisiana Agricultural Experiment Station and the American Sugarcane League.

Erect growth, uniform stalk height and stiffness during cutting and stacking make the new variety naturally adapted to mechanical harvesting. Latest in a long series of hybrids developed for the Gulf States since mosaic disease all but wiped out Louisiana's sugar cane plantation a generation ago, the new cane even has a machine-age, coldly factual name: "CP 43/47."

Science News Letter, August 5, 1950

SCIENCE FIELDS

MEDICINE

Vitamin B₁₂ Prevents Shock

► VITAMIN B₁₂, that is proving of importance in promoting growth in animals and humans, as well as treating pernicious anemia, now is shown to be able to prevent anaphylactic shock, even when used in very small quantities.

In experiments with guinea pigs, Dr. Vincenzo Traina of Fairview Park Hospital, Cleveland, found that no other substance is able to protect from this form of shock when used in such small quantities.

Dr. Traina made his report to the British science journal, *NATURE* (July 8).

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MEDICINE

Use Embryos to Prospect For Anti-Cancer Chemicals

► CHICK embryos can be used to prospect for possible cancer-controlling hormone chemicals, Dr. C. Chester Stock of Sloan-Kettering Institute, New York, announced at an international gathering of cancer researchers at Ciba Foundation in London.

The method is based on the observation that minute quantities of cortisone and other anti-cancer steroid hormones cause baldness in the embryos and inhibit their growth.

The stunting and baldness are not directly correlated with anti-cancer activity, Dr. Stock said, but they are indicative. Since very tiny amounts of active steroids will produce these chick embryo effects, the method should be an invaluable screening measure for detecting the presence of promising chemicals in mixtures and extracts of uncertain composition.

An alternative screening method is to measure the effectiveness of a steroid in inhibiting the growth of certain tumors implanted in mice. The advantage of both these methods over direct trial on patients is that they require such small quantities of the chemical, which is often initially available only in preciously small amounts.

Science News Letter, August 5, 1950

NUTRITION

Correct Foods Not Chosen Automatically

► DON'T be fooled by the "naive assertion" that a child or adult will automatically choose the foods he needs on the simple basis of taste and appetite. This is the warning of Dr. C. G. King, scientific director

of the Nutrition Foundation in New York.

Some individual animals have automatic guidance in selecting foods needed to preserve or regain health. This was shown in experiments by Dr. E. M. Scott and associates at the University of Pittsburgh. But Dr. King explains that this ability varies with different nutrients and from animal to animal.

Even when in a cage where they could eat a good quality milk protein whenever they wished, many animals in Dr. Scott's experiments lost weight and even starved to death for lack of protein.

Even more striking was a failure to select essential magnesium salts even when salt mixtures containing them were available.

Science News Letter, August 5, 1950

RADIOLOGY

Radioactive Arsenic and Gold Valuable Tracers

► ARSENIC and gold in their radioactive forms are two of the Big Six medically valuable radioactive tracer atoms at the present time, Dr. Leon O. Jacobson of the University of Chicago declared at the sixth International Congress of Radiology in London.

More than 700 radioactive tracer atoms have been prepared, he reported, but he called these six the most valuable.

Radiophosphorus is used in many forms of diseases of the blood and blood-forming organs and radioiodine is used to treat thyroid gland cancer. The other four are promising, Dr. Jacobson said, but have been less thoroughly explored.

Science News Letter, August 5, 1950

INVENTION

Earphones at Each Seat Allow Opera Translations

► AS the thunder and fire of a Wagnerian opera roll out across the Metropolitan Opera House, how many of the opera-goers can understand the words being sung? Not many, says a music-loving inventor from Morristown, N. J., who would like to put science to work at the opera.

Single miniature earphones at each seat would allow a running translation of the opera by a competent narrator, B. F. Miessner writes in the *JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA* (July). Coin-released, the earphones would have an output just loud enough for the listener, but low enough not to disturb the persons next to him.

Held by rubber earplugs sterilized each day, the listening device could be switched on or off at will. Such a scientific sound system might even popularize opera enough to make it profitable, Mr. Miessner theorizes.

Science News Letter, August 5, 1950

MEDICINE

Sleeping Depends On Brain Stem

► "TO sleep, perchance to dream" depends on the brain stem, it seems from studies by Dr. H. W. Magoun, professor of anatomy of Northwestern University Medical School.

The brain stem, about the size of a man's thumb and four or five inches long, runs from the top of the neck up into the skull to the two cerebral hemispheres of the brain.

Dr. Magoun, assisted by Dr. D. B. Lindsay, Northwestern professor of psychology, and Dr. Giuseppe Moruzzi, visiting professor from the University of Pisa, Italy, came to the conclusion that the brain stem serves normally to keep the rest of the nervous system awake.

Dr. Magoun reported that by direct stimulation of the brain stem of sleeping animals it is possible to produce all the features of wakefulness. Destruction of the brain stem, on the other hand, leaves animals in a state of pathological sleep.

However, it is not yet known just how the brain stem controls sleeping and waking states. Dr. Magoun thinks that sleep in man is brought about by a lessening of sensory impulses which reduces brain stem activity.

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METEOROLOGY

Frigid Upper Air Sinking Causes Winter's Cold Spells

► MASSES of frigid air in the stratosphere that sink to the earth are the cause of severe winter cold spells that grip large sections of the globe simultaneously.

This is the opinion of Dr. William Kellogg, geophysicist at the University of California at Los Angeles, who bases it on evidence gathered while studying upper atmosphere conditions for the U. S. Weather Bureau. This is his theory:

Air masses are constantly circling the earth. There appears to be a continuous flow of air from the summer hemisphere to the winter hemisphere in the region between 20 and 50 miles high. As a result, air is piled up over the polar regions in the winter—with a consequent sinking and outflow in the lower atmosphere.

This outflow at low levels from the winter pole may be more rapid when the flow in the upper atmosphere speeds up. Such an increased outflow would cause the cold air masses near the ground to move toward the equator, thus causing severe cold spells in the middle latitudes.

Evidence for Dr. Kellogg's sinking theory is that ozone is occasionally forced to the ground level in polar regions in winter. Normally, ozone exists at altitudes of 10 to 20 miles.

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INVENTIONS

Phantom Inventions

Legends about inventions ranging from the everlasting razor blade to the better carburetor have sprung up. Attempts to trace such stories end in dead alleys.

By ROGER WILLIAM RIIS

► "THE straight fact is—and I know what I'm talking about—it is perfectly simple today to produce a carburetor that will give us 50 miles to a gallon of gas. But the big oil companies suppress it. They've bought up the patent and put it away in permanent cold storage. You don't think they'd be fools enough to cut their own throats by producing a really good carburetor, do you?"

Have you heard about that carburetor?

Have you heard about the steam automobile which could be built today vastly superior to the gasoline buggy—if the oil companies and all the other established automotive interests would only stop suppressing the patents?

Have you heard of the telephone instrument which the telephone people could perfectly well manufacture, with television attachment so you could see the person you were talking to? Or the camera with built-in exposure-meter and automatically controlled shutter, which the camera people could produce profitably for \$10, if only they would stop suppressing the patents?

Or the razor blade, to fit any safety razor, made out of a new steel alloy treated by a new atomic method so that a single blade will last forever? Or the individual radio, no bigger than a match box, so you could be always in touch with whomever you wanted to be in touch with?

Stories about such inventions go on and on, told year in and year out, always with indignation at the wicked corporations, and always with "I got it straight because the chap who works next to me has a brother who—"

The stories have four common characteristics: (1) they are never first-hand; (2) the hero is usually a poor but brilliant inventor; (3) the villain is the wicked corporation which suppresses the most desirable inventions to its own cash profit and to the public's lasting suffering; (4) they are all untrue.

Recently several companies have been at pains to run down these rumors. They wanted to run them down because, if there were any such splendid inventions anywhere, the companies wanted to buy them and use them. If there were in fact no such inventions, the companies were curious to find out how the stories ever got started.

The myth of the everlasting razor blade recurs with annoying frequency, the Gil-

lette Company admits—every year or so, but always by word-of-mouth rumor. But not long ago it became so definite as to appear in print in a reputable newspaper, which even said that Gillette had paid seven million dollars for the patent.

Hopeful of coming to grips this time, the company wrote the newspaper, saying they knew nothing of any such patent or transaction, but would very much like to. After months of effort, by newspaper and manufacturer, this is what developed:

The writer had been told the story of the razor blade by his former professor of journalism. This looked like a sure lead. But the professor, questioned, could only say: "I have been trying to think just where I got hold of the information concerning Gillette. It occurs to me that it came from a book called *Putting It Over*. The names of the authors escape me at the moment but I remember it is by two men, experts in the general publicity field. I can see the cover of the book, black and soft leather, and the thickness, but I can't get the names."

Though the professor could not trace down the book which he asserted was his authority, the Gillette Company did, through the Library of Congress. Neither the story in question nor any mention of Gillette appear in the book. The trail simply disappeared. Once again Gillette missed out on the everlasting razor-blade.

During 1949 such very circumstantial stories about an astounding new carburetor ran around the country that Sun Oil took notice. Millions of people heard the story, which kept very close to the same plot.

A man who had been months on the waiting list for a new car was overjoyed when at last his number turned up. Proudly he drove away in his new chariot, and spent every leisure moment of the next month in it. After the first 500 miles he took it back to the dealer for a check-up.

"It's the most marvelous car ever," he assured the dealer. "Your sales talk didn't do it justice. Do you know, I've been getting 50 miles to the gallon of gas?"

"What!" gasped the dealer. "Good heavens! Wait a moment."

Swiftly he lifted the hood and looked within. A moment later, greatly disturbed, he turned to his customer:

"Say, I'm awful sorry about this, but you got the wrong car. You got a special factory job they've been looking for all over the country, one they were experimenting on. It got out by some mistake, and

they've got to get it back. My orders are to give you anything you want in the way of another car or a cash refund."

There are fascinating little variations in the story, which give it remarkable semblance to truth. In one version the story ran that two such experimental cars had got out, but one had been found in New England and recovered. In another, the owner of the car was given a new car of twice the sales value plus a check for \$1000.

The stories were outstanding for their clarity and definite detail. Sun Oil therefore sent men out to track down this mystery car. When they were told "a business friend of mine from Chillicothe actually knows the guy it happened to," off they went to Chillicothe. But the business friend didn't know the guy it happened to, he knew a bar-tender who had had the story first-hand from a pal.

You know the rest. The investigators never succeeded in getting any closer to the source of the story, or to the wonder carburetor than you are now. They never got any name for the supposed inventor, or the name of the oil company that supposedly had concealed the patent, or the name of the dealer who had sold the car.

After long investigations, Sun Oil points out several details of importance: in the first place, it is physically impossible for a factory-test car to become mixed up with the production-line cars. They aren't even made in the same plants. In the second place, no industry has been as plagued by rumor as has the oil industry by the insistent rumor of vast savings in fuel consumption. Most of us have seen mysterious contraptions hooked up on cars whose hoods have been raised as they stand in a busy city street, while swift-talking demonstrators orate and sell samples. There are at this moment probably a dozen such get-rich-quick schemes being promoted—at someone's expense.

The National Bureau of Standards has recently tested the current crop of alleged gas economizers. After many years at this testing, the engineers say sadly that they have never discovered a single one with any basic value. A few of them do actually effect a small fuel saving, but they do it by mixing additional air into the carburetor, a simple matter which can be much more efficiently done by adjusting the carburetor itself.

"We have been accused of delaying introduction of more efficient types of equipment," admits the American Telephone and Telegraph Company and adds plaintively, "but the facts do not bear this out; on the contrary, the Bell System has made outstanding advances in the telephone art."

Perhaps the best guaranty that no patents have been suppressed for selfish reasons came during the days of the Temporary National Economic Committee, more familiar as the TNEC. In 1938-39, TNEC held exhaustive hearings on charges that patent rights were being abused; and the make-up of this Committee was not partial to big business. If it could have found evidence of patent sins, it would have been happy. At the same time, a national group of scientists and two national business associations launched the same search, inviting one and all to come and testify. No one did. Not a shred of evidence suggested any suppression of any patent.

International Business Machines has a smoothly functioning method to insure that anything remotely resembling a useful invention gets a fair chance. General Motors has built up for 26 years its New Devices

Section in which it has opened 103,000 files for individuals who have submitted over 145,000 devices. These range from complicated mechanisms and highly technical processes down to a simple suggestion like a light under the hood. Over 3500 persons have suggested directional signals; over 1000 have submitted the idea of headlights that turn with the front wheels.

The company gives every idea careful attention, because you just never can tell. Among the many inventions they have bought since the war are developments in steering linkage, engine-mounting systems, combined starter and accelerator controls, cages for ball bearings and similar highly technical devices.

"We certainly aren't suppressing anything," exclaim the engineers unanimously. They ought to know.

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when taking aureomycin orally. The patient retains enough aureomycin in this way for it to be effective.

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On This Week's Cover

► INDUSTRY seeks to harness atomic energy! A dramatic moment was reached as a gas sample was taken following addition of isotopes to molten steel in an experimental foundry.

The metal was made radioactive in order to investigate possible application of tracer technique as an aid to quality control in steel production operations. When a minute amount of radio-isotope is added, the activities and changes of elements in the metal can be more readily traced. It was hoped to determine quantities of elements evolved in the gas and those remaining in the metal.

Research engineer taking the sample (holding long-handled steel rod, padded with asbestos) wears coat, gloves and respirator which comply with safety and health requirements set by the U. S. Atomic Energy Commission to prevent contamination. Respirators are worn in any location where air-borne beta and gamma emitters are present. All operators conducting this experiment wore laboratory coveralls to reduce clothing contamination.

Engineer at left watches as gas enters bottles containing liquid. These instruments are held by floor-type ring stand. The gas-collection apparatus is operated by vacuum pump. Instruments shown on floor measure rate per second gas is received during the evolution period. Funnel-shaped gas intake collector (shown near electric furnace and ladle of molten metal) is held at safe distance by operator. The entire experiment was conducted under a special exhaust hood to prevent spread of air-borne emitters.

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GEOLOGY

Germanium in Washington

► THE richest deposit of the vital war material, germanium, yet found in the United States has been discovered in the earth of parks, playgrounds and other locations in Washington, the nation's capital.

This vein of treasure from the Patuxent formation runs from Baltimore to Richmond, U.S. Geological Survey scientists find.

The deposits contain up to six percent germanium. The highest content previously reported, in the mineral germanite in Africa, was 10%. The District of Columbia deposits also contain vanadium, chromium and gallium.

Discovery of the new germanium deposits is reported by Taisia Stadnichenko, K. J. Murata and J. M. Axelrod in the journal SCIENCE (July 28).

The deposits are in the lignite remains of *Cupressinoxylon wardi*, a tree somewhat

similar to the coniferous family from the Cretaceous era, about 100,000,000 years ago.

Germanium is particularly valuable for electronic instruments. It is a semi-conductor, being intermediate in conductivity between metals and insulators. Photo-electric cells, rectifiers, transmitters and mixers (combination transmitters and amplifiers) are among the important uses for germanium crystals. These crystals are rapidly replacing vacuum tubes for many uses.

Mining operations in such a thickly populated district will make recovery of the germanium in these deposits somewhat of a problem. The germanium and the other elements, however, are recoverable if the need should be great enough. Previous to this discovery, the main source of germanium in the U. S. has been as a by-product recovery.

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MEDICINE

Milk with Aureomycin

► MILK, valued as a food, is gathering new laurels for itself in aureomycin treatment, Drs. Lloyd G. Bartholomew and Donald R. Nichols of the Mayo Clinic report. Used as an agent to control vomiting caused by aureomycin treatment, milk, as compared with other nausea-control agents, allows for the best absorption of aureomycin into the blood stream.

Patients receiving aureomycin are often affected by nausea and vomiting. To counteract the vomiting, aluminum hydroxide gels have been used in the past. However, recent studies demonstrated that the aluminum hydroxide hinders the absorption of the aureomycin into the blood stream.

To control vomiting, one glass of milk given with the aureomycin was most effec-

tive. Of the 50 patients receiving this combination, only four experienced significant nausea and vomiting.

Further studies were carried out to see if the use of milk hindered the absorption of the aureomycin into the blood stream. One group received aureomycin alone, one group received aureomycin with aluminum hydroxide, and one group received aureomycin with milk. The levels of aureomycin in the blood serum after the administration of 750 mg. of aureomycin with 200 cc., or one glass, of milk were approximately the same as the levels obtained when 750 mg. of aureomycin was given alone to fasting patients.

Except in an occasional case, vomiting is controlled by drinking one glass of milk

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ANTHROPOLOGY

Search for Missing Link

The exclusive coverage of the anthropological expedition to the "nursery of man" is concluded. Map showing high points of expedition in SNL, July 29, p. 75.

By DR. HENRY FIELD

SHARJAH, TRUCIAL COAST, PERSIAN GULF—This ancient Pirate Coast, known for a century as the Trucial Coast, is ruled by seven independent sheiks.

This area is two hours flight from Bahrain island and we arrived here in an R.A.F. DC-3 with bucket seats.

The sheiks rule the foreshore, but the interior is relatively little under their sway.

The mysterious Schuhuh tribe live in caves up a narrow creek. They do not like foreigners. They have never been photographed or studied.

The British guide the seven sheiks in their foreign policy. There are no police. There is no rule except that of each sheik. There are no telephones. The principal source of revenue is pearl-fishing. I went out to the fleet to watch the divers at work. Each man fastens a nose clip in place and with a lead weight between his toes he sinks to the ocean floor, at this point 30 feet deep. About two minutes later he surfaces with a handnet full of oysters. This is indeed hard work for relatively little. The average diver makes about \$10 per month from June to September, not much in relation to the cost of pearls on Fifth Avenue or State Street.

The waters along the Trucial Coast abound in fish. The nets are usually full. Sail fish are plentiful; here they are reported to be the largest in the world.

From an archeological standpoint, there are two ruins, one at Ras al Kheima, the other on the island of Umm on-Nar. These are probably Portuguese ruins but time did not permit me to visit them. In the market places of Sharjah and Dubai I saw the customary medley of racial types, worthless from the point of view of the physical anthropologist. In the interior at Bireima Oasis, on the mountain slopes of western Oman or among the true Bedouins there is much to be done, but the inaccessibility and the almost certain lack of cordial cooperation on their part would make this task extremely difficult, even during the winter months.

The Trucial Coast is my farthest point from Harvard. It is now time to start for home via Bahrain and across Saudi Arabia to Beirut.

Ibn Saud at Last

DHAHRAN, SAUDI ARABIA—When I stepped ashore from an Arabian-American Oil Co. launch at Al Khubar on the Per-

sian Gulf, it was a great moment for me. For more than 12 years I had wanted permission to begin anthropological researches in the Kingdom of Ibn Saud, Lord of Arabia.

Through the mediation of Assistant Secretary of State George C. McGhee and Ambassador J. Rives Childs in Jidda, permission was granted for me to land at Al Khubar and proceed to Dhahran where I was the guest of the Arabian-American Oil Co., known as Aramco.

The following day I was driven by Dr. Willard C. Beling to the ruins of a large city a few miles southeast of Dhahran. Here on the surface lay hundreds of broken potsherds amid shellheaps. Within an hour we had collected a representative series for the Peabody Museum at Harvard.

Since we were out in the middle of a good old-fashioned sandstorm, locally called shemal (with the addition of a few well-chosen American epithets), our progress was slow. Our eyes were filled with sand which swirled around so that it was hard to see our shoes. The wind was blowing at 40 miles per hour and the shade temperature was about 110 degrees—not ideal conditions for scientific research!

The shellheaps were covered with oysters—probably the refuse of ancient pearl-fishers or oyster-frys. The pottery was ornamented with designs and some of it was glazed. Fragmentary glass bracelets were also seen.

This ruin, known as Ain as-Saih, must have been an ancient city on the shore of the Persian Gulf. Many travelers have visited these sandy mounds. Nearby a few palm trees struggle against the sand which sweeps on relentlessly.

No digging was possible even if the dust had not been blowing, for my permit specifies clearly that only surface material shall be collected on this brief reconnaissance along the Trans-Arabian Pipeline called Tapline.

The sherds from Ain as-Saih will form a welcome addition to the Peabody Museum study collections. Here comparative material is being collected from throughout Southwestern Asia. The sherds themselves are valueless, but as the collection grows in representative sherds from a wide range of localities it becomes possible to assign dates to new material. This side of research is never seen by the public. However, its usefulness is readily understood.

Future work at Ain as-Saih may reveal its ancient name and its place in the his-

tory of the Persian Gulf, an area which has long been occupied. First came the ancient dwellers of Mesopotamia and Persia, later the Phoenicians and Arabs. Even Chinese junks sailed these waters, long renowned for their pearl-fisheries.

A Page from Bible Days

AL GAISUMAH, SAUDI ARABIA—Along a now dry streambed wadi have moved countless camel caravans through several millennia. The village of Hafar al Batin, to which I drove with John C. Kelley, lies on one of the main lines of migration between Baghdad and Rujadh, capital of Saudi Arabia.

A flight from Dhahran, with a brief landing at Mishaab, was across a flat, unbroken wilderness, and it brought me to Al Gaisumah, really into the depths of Saudi Arabia at last.

As we approached the famous village near here we saw the plain strewn with about 400 black tents of the Bedouins. Beyond lay the fort with its crenelated battlements and towers. Hundreds of camels, sheep and goats were being watered from the many 100-foot wells. Our arrival in a cloud of flying dust disconcerted quite a few of the camels, their snorts being obvious distaste at the approaching wheeled monster.

We stopped to drink a cup of bitter, black coffee brewed for us by Sheik Ibn Museis of the Muteir tribe. Here under the black tent we were back in the days of Abraham, for Bedouin life has remained but little altered during the past 5,000 years.

Looking around the little circle squatting on the rug-covered ground I observed that these Bedouins belong to the basic Mediterranean stock. They have changed little in type, guarding their racial purity with the strictest of sanctions. The Bedouin women do not veil; their faces are ornamented with simple tattooed designs. The teeth of these Bedouins are remarkably good for they eat little sugar and no canned food.

We returned to Al Gaisumah, this being the name of a yellow-flowered shrub abundant in this region. Here is Station No. 3 of the world's largest construction project, the \$300,000,000 30-inch pipeline to carry the oil from Abgaig near the Persian Gulf to the ancient town of Sidon, which according to Matthew (XV:21) was visited by Jesus. Such is the twentieth century blending of the ancient and the new.

Flint Flakes Found

RAFHA, SAUDI ARABIA—On a low hill near here, where ancient man could camp secure from surprise attack, we have found a few flint flakes obviously chipped by human hands. This is the first link in northern Saudi Arabia with the men of the

Old Stone Age. The evidence was thin but positive.

We had driven along the 30-inch steel snake, known as the Trans-Arabian Pipe Line, from Al Gaisumah to the next pump station to the northwest called Rafha. The hill was an obvious place to look for traces of Stone Age man whose handiwork I have been pursuing for 25 years from southwestern Sinai to the Caucasus mountains.

In nearby Jumaima, hundreds of camels were being watered by the Shammar Bedouins, whose black tents dotted the plain. At Jumaima there was plenty of water, but the wells were deep and the big stone cistern overcrowded with the drawers of water.

This cistern lies on the famous Darb es-Zobeida, the main camel track southward from Baghdad to Mecca. This road is named for the beauteous Zobeida, consort of Haroun el-Rashid. This woman encouraged the building of water cisterns and rest houses all along the pilgrim way.

It is safe to assume that her name is blessed among the hot and tired pilgrims, for this land is indeed inhospitable—even to those on a sacred mission.

We turned south about 25 miles to visit the ruins of Zabala, one of the most famous halting-places on the Darb es-Zobeida. Many Arabic authors describe this haven on the Pilgrim road. For example, during January, 925 A.D. the Carmathians defeated the soldiers who were guarding Zabala; only a few of the Persian pilgrims on their way to Mecca escaped.

The main courtyard of Zabala is now enclosed by crumbled walls. In the center lie six fresh Bedouin graves, piled with fallen rubble. Glazed potsherds were collected for the Peabody Museum at Harvard; this glazing is now a long-forgotten art.

To the north lie three wells, each more than 175 feet deep. The deepest is rectangular and faced with dressed stone. At night it would not be difficult to plunge into this well either on foot or in a car, for the top is flush with the ground. This would indeed be a mysterious disappearance.

Roman Fortress Discovered

TURAIF, SAUDI ARABIA—On a lonely hilltop near the road along the Trans-Arabian pipeline on the way to this Station VI, we found and collected stone implements of Paleolithic type, evidence of stone age man which links with the other discoveries in Jordan and Iraq.

But a newly discovered Roman fortress was also an important site explored, for it is the most eastern outpost of the Roman empire.

The ruins lie 10 miles to the southwest. Here at the western end of a large mudflat, now dry as a bone, lay a catchment basin faced with dressed basalt boulders. Nearby stood the lower portion of a gateway leading into a rectangular courtyard

beyond which were the foundation stones of six rooms.

No one else built like the Romans. Their superior handiwork remains a marvel of the centuries. We made a ground-plan of the gate and courtyard and searched in vain for an inscription. Pottery was collected on the surface of the ground. Stretching for several acres were piles of basalt meaningless without an aerial photograph.

This newly-discovered Roman fortress must have formed a link in the chain of outposts protecting the town from the desert. To the northwest lies Qasr el-Azraq; to the north Qasr el-Burqu, long described as "the most eastern outpost of the Roman Empire." Now Qasr ed-Daiguera takes this as its rightful place.

Perhaps in the long-veiled Wadi Sirhan to the south lies another unknown Roman outpost? Future exploration alone will decide.

We drove across the hot low-rolling gravel and sand-covered hills to the southwest searching here and there for prehistoric stone implements, collecting plants and chasing the elusive lizards.

We passed through a wind-swept canyon where dozens of basalt blocks showed the amazing effect of wind-action, called "drei kanter." These blocks were trimmed in o'neat, triangular shapes by the continual etching of the wind. Driving by a huge salt lake, whose surface glistened in the distance, we came around a bend over a hill and there before our eyes was the oasis of Qalyat al-Milh on the fringe of the great Wadi Sirhan. To the right stood a fort with four corner towers, reminiscent of "Beau Geste."

A Negro servant of the Emir welcomed us for his master was sleeping during the heat of the early afternoon; moreover, it was Ramadan and all were fasting until sundown.

Beyond lay the flat-topped village bordered by many palms, none of whose branches swayed in the listless air. On the high hill above was a fort with a broad track leading to the summit.

We returned to Turaif in the cool of the evening for there the thermometer read only 98 degrees in the glow of the sunset.

Earliest Commercial Article

BEIRUT, LEBANON—Probably the flint we discovered on the slopes of a blacker-than-black hill at Tell el-Hibr near the Saudi Arabian border was the earliest article of commerce.

On the southern slope of this hill, rising about 500 feet above the level of the plain, were quantities of flint flakes chipped by human hand. This flint, some of it honey-brown in color, is the best quality I have ever seen in this part of the world. Here the prehistoric flint-knapper must have truly enjoyed his work.

A parallel case of flint figuring in trade is in Western Europe. Flint from the famous quarry at Grande-Pressigny in France has

been found hundreds of miles away—presumably by trade in Neolithic and later times.

Tell el-Hibr thus forms an important link in the chain of evidence for the distribution of Paleolithic Man in Southwestern Asia.

A Trans-Arabian pipeline Navion plane took me to Beirut.

As we flew northwest we soon crossed the undemarcated boundary between Saudi Arabia and the Hashimite Kingdom of the Jordan. From 2,000 feet I waved au revoir to the kingdom of Ibn Saud, grateful indeed to him for allowing me to be the first anthropologist to make a reconnaissance survey in his country which is so rich in the cultural history of mankind.

We stopped at Station VI A to pick up a sick man and his friend. Flying low over eastern Jordan we could see many ancient villages with their circular enclosures on the edge of now-dry streams. Some of these near mudflats were fishing communities. From the abundance of these stone circles this part of Jordan must have supported a relatively large population based on the former fertility.

Leaving the high, forbidding mass of Jebel ed-Druz on our right we flew over Deraa in southern Syria, where the Israelites slew Og, king of Bashan (Number XXI: 31-35). Ahead loomed Mount Hermon, an imposing mass.

The little Navion seemed to strain to fly higher, 8,000 feet, 8,500 feet, 9,000 feet. To my untrained eye, we were not going to make it. I shouted to the pilot. "Are our wheels up? I'm afraid we will touch the top." He smiled reassuringly as he tapped the altimeter. "Five hundred feet to spare," he yelled. He was quite right.

We landed at Beirut exactly to the minute on time.

The expedition was finished except for the hard work of getting the specimens packed and on board the ship and the researches yet to be done.

I am sailing on the American Export SS "Exeter" with 18 packing cases of specimens bound for the Peabody Museum at Harvard.

Since March I reconnaissance work has been done in Syria, Iraq, Persia, Kuwait, Bahrain, Qatar, Trucial Oman and Saudi Arabia. Some gaps had been filled, some discoveries made.

Return of Science

BAGHDAD, IRAQ—Iraq, once called Mesopotamia, stands in the center of southwestern Asia on the crossroads of Asia, India, Africa and Europe. For that reason the birds, animals and insects of Iraq are of unusual interest.

This is so because they have many varied forms, ranging from those to be found on the mountains in the north to the alluvial plain in the center and south. On the mountains live the ibex, deer and bear. On the plains roam gazelle, jackal, fox, hyena and, near the Twin Rivers, wild boar.

Hundreds of species of birds, insects and plants flourish in the wide climatic range. The geology of Iraq is of primary importance because of the vast reserves of revenue-producing oil.

The first zoological collections were made in 1918 by the members of a British Expeditionary Force. The specimens were identified at the British Museum, where the majority of the type collections from southwestern Asia are to be found.

In 1927-1928, as leader of the Field Museum North Arabian Desert Expedition and again in 1934, I collected many series of animals and plants, now in Chicago.

However, it has long been obvious that a natural history museum should be founded in Baghdad so that not only specimens could be centralized, but also publications could be issued in Arabic and English. I discussed this general outline in 1934 with the late King Ghazi, who showed an enthusiastic response.

In 1946, the Regent opened the Natural History Museum with zoological, botanical and geological sections, as well as a room devoted to the study of evolution. The director, Dr. Bashir E. Allouse, has just published "A HANDBOOK OF THE BIRDS OF IRAQ" so that the Iraq government is now for the first time sponsoring scientific research and publications.

In the garden of the museum, under a date palm, about 20 turtles swim around or rest in the shade. These were collected by us in Kurdistan and presented by the Peabody Museum-Harvard Expedition.

Thus science has come back to a nation which 2,500 years ago led the world in mathematics and astronomical research.

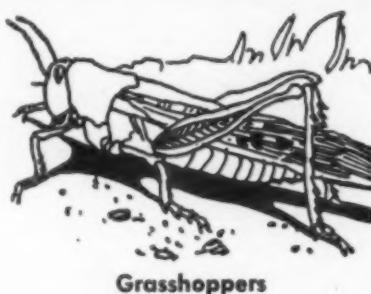
Ancient "Whodunnit" Tackled

NIMRUD, IRAQ—Evidence of what may have been an unsolved murder committed 3,500 years ago was just unearthed at Nimrud, near Mosul, Iraq, when the skeletons of two young boys were found buried under the floors of a room in King Ashurnasirpal's palace.

Solution of this ancient "Whodunnit" has been undertaken by Agatha Christie, mystery story writer, who, as wife of Prof.

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Grasshoppers

► IN Aesop's fable of the ant and the grasshopper the ant is made out to be sober, conscientious, and hard-working, with a provident eye for the rigorous winter ahead. The grasshopper is painted as a frivolous idler who fiddles the summer away with no care for the morrow.

Actually Aesop was more of a moralist than a naturalist. As a tale-teller with an axe to grind, Aesop may also have harbored an unwitting prejudice against a creature endowed with a built-in musical instrument. For grasshoppers, although far from idle, do produce a rhythmic sound that is enchanting or irksome, depending on your point of view.

The male grasshopper can fiddle or keep silent at will. When it feels like sounding off, it rubs the inside of the hind legs

Max Mallowan, is one of the technical staff of the expedition sponsored by the British School of Archaeology. On this problem she will have to work without the aid of her detective master mind, mustachioed Hercule Poirot.

Finding the bones of the two boys hidden in the royal palace was reminiscent of the death of the two little princes in the Tower of London. Mrs. Agatha Christie Mallowan regards the problems of unraveling the past more fascinating than modern mystery fiction.

Other rooms, halls and passages of this palace were decorated with winged bulls and lions and long, inscribed texts in cuneiform which listed the many titles of King Ashurnasirpal. It was this king who, about 330 B.C., restored what was then Calah and now is Nimrud, as capital of Assyria. In Nimrud, Prof. Mallowan and his staff have excavated great winged bulls weighing many tons.

In Nimrud also was found the site of what was probably the world's first and largest zoo. Here the kings of Assyria kept thousands of animals. Visitors came from near and far to see the curious animals from Asia and Africa. Particularly

against the wings, producing a rasping or crackling sound. It can do this one leg at a time or both together. The female is unable to fiddle.

Katydid and crickets, which are closely related to grasshoppers, are even more musical. They produce a louder tone and a more varied phrase. Their songs, with day and night variations, have been written down in musical notation. It might be an interesting experiment to go out into the fields with a violin and play the katydid song and see what kind of back-talk you provoked.

But grasshoppers are neither all music nor all frivolity. Their business in life is to eat and to reproduce, and they allow their fiddling to interfere with neither. Grasshoppers are vegetarians, and sometimes when they become extremely numerous they move forward in great swarms, ruining crops and devastating the countryside. The locust plagues described in the Bible were caused by a species of grasshopper.

If grasshoppers sometimes show a partiality for the same foods that man likes, man has frequently returned the compliment in a lefthanded sort of way by feeding in turn on the grasshoppers themselves. In many parts of the world roasted grasshoppers are eaten as a food. The Japanese have found that they are even more nutritious than fish.

Some American Indians used to eat grasshoppers, and at least one contemporary American naturalist, Wilfrid S. Bronson, has broiled and eaten them out of scientific curiosity. He says they taste like lobster.

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popular then, just as in the modern zoos today, were the trumpeting elephants.

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INVENTION

Milking Chores Eliminated: Device Holds Cow's Tail

► COWTAIL holder, on which the government recently issued a patent, will ease the job of the hand milker in fly-time and eliminate the small-boy former chore of holding the tail while daddy draws the milk. Farm-raised city men, as well as present cow owners, will appreciate this device.

It is a simple gadget with two arms pivoted in the center like ordinary shears. A spring between the handle ends to the rear hold the jaws of the forward part closed. To use, these jaws are opened, the hairy part of the tail inserted between pads, then closed on the cow's leg. The jaws hold firmly but without disturbing the composure of the animal.

The inventor is Albert J. Kline, New Douglas, Ill. For his efforts he received patent 2,513,494.

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Books of the Week

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BIBLIOGRAPHY OF RAILWAY LITERATURE—*Association of American Railroads*, 4th ed., 48 p., illus., paper, free upon request to publisher, Transportation Building, Washington 6, D. C. A list of many of the books and stories that have been written about railroads and railway travel.

THE CASTLE OF IRON: A Science Fantasy Adventure—L. Sprague de Camp and Fletcher Pratt—*Gnome Press*, 224 p., \$2.50. A science fiction story based on a theory that there were many possible worlds existing side by side in time, separated from us only by limitations of the mind.

COMPOSITION OF FOODS—RAW, PROCESSED, PREPARED—Bernice K. Watt and Annabel L. Merrill—*Gov't. Printing Office*, U. S. Dept. of Ag. Handbook No. 8, 147 p., illus., paper, 35 cents. A handbook presenting three tables of data on the proximate composition of foods.

DESIGN AND OPERATION OF DRAINAGE PUMPING PLANTS—John G. Sutton—*Gov't. Printing Office*, U. S. Dept. of Ag. Tech. Bull. No. 1008, 81 p., illus., paper, 25 cents. A report of a study made of 17 representative drainage pumping plants in the upper Mississippi Valley.

EDUCATION OF THE GIFTED—Educational Policies Commission—*National Education Association* 88 p., paper, 35 cents. Stressing the importance of recognizing and utilizing talent. (See SNL, June 17, p. 374.)

GEOLIC DESCRIPTION OF THE MANGANESE DEPOSITS OF CALIFORNIA—Parker D. Trask and others—*State of California, Division of Mines*, Bull. 152, 378 p., illus., \$2.75. A detailed report of the individual manganese deposits in California.

GRAY'S MANUAL OF BOTANY: A Handbook of the Flowering Plants and Ferns of the Central and Northeastern United States and Adjacent Canada—Merritt Lyndon Fernald—*American Book Co.*, 8th ed., 1632 p., illus., \$9.50. The first new edition of this reference manual to be published since 1908.

THE HYDROGEN BOMB AND INTERNATIONAL CONTROL: TECHNICAL AND BACKGROUND INFORMATION—*Joint Committee Staff on Atomic Energy*, 41 p., illus., paper, free upon request to publisher, Washington 25, D.C. Printed for the use of the Joint Committee on Atomic Energy.

INFRARED DETERMINATION OF ORGANIC STRUCTURES—H. M. Randall and others—*Van Noststrand*, 239 p., illus., \$10.00. A monograph on how to determine molecular structure by using infrared spectra. For chemists, biochemists and physicists. There are 354 black and white plates.

MANAGEMENT OF NATURAL SLASH PINE STANDS IN THE FLATWOODS OF SOUTH GEORGIA AND NORTH FLORIDA—Robert D. McCulley—*Gov't. Printing Office*, U. S. Dept. of Ag. Circ. No. 845, 57 p., illus., paper, 20 cents. A guide for managers of stands of natural slash pine.

PREFUDICE IN TEXTBOOKS—Maxwell S. Stewart—*Public Affairs Committee*, 31 p., illus., paper, 20 cents. A summary of a study made

by a committee of the American Council on Education on the textbooks and courses of study used in our schools.

THE PRINCIPLES OF SCIENTIFIC RESEARCH—Paul Freedman—*Public Affairs Press*, 222 p., illus., \$3.25. A guidebook for people about to embark on scientific research. Such topics as research and society, research and philosophy and general conditions of experimentation are discussed. American edition of an English book, listed SNL, Feb. 11, 1950.

THE REMARKABLE EXPLOITS OF LANCELOT BIGGS: SPACEMAN—Nelson Bond—*Doubleday*, 224 p., \$2.50. The adventures of Lancelot Biggs, mate of the spacelugger Saturn. Fiction, of course.

THE SCHOOLS OF CORPORATE REFORM—Harold Gill Reuschlein—*University of Pittsburgh Press*, 117 p., \$2.50. A study of the pros and cons of corporations.

TODAY'S BOOKS FOR CHILDREN AND TOMORROW'S WORLD—Gladys Murphy Graham—*American Association of University Women*, 22 p., illus., paper, 20 cents. A small brochure reviewing children's books written about life in other countries. Some fairy tales are included.

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GEOLOGY

Use Natural Gas to Free Liquid Fuels for Military

► MORE liquid fuels for military uses are available, without disrupting home and industrial needs for heat and power, with the greatly increased use of natural gas that has come about particularly during the past decade.

Natural gas now supplies nearly 20% of the nation's commercial energy consumption, according to Dr. James J. Parsons of the University of California. He is the author of a timely publication issued by the university entitled *THE GEOGRAPHY OF NATURAL GAS IN THE UNITED STATES*.

For each 42-gallon barrel of crude oil produced in the United States today, the equivalent of an additional 25 gallons comes to the surface as natural gas or its contained liquids, he states. Both net and marketed production of natural gas have more than doubled in less than a decade.

Use of natural gas for fuel purposes in other countries is small in comparison with the tremendous consumption in the United States as a result of this expansion during the past 10 years. This country used some 140 billion cubic meters in 1948, and is using much more now. The only other countries that produced more than one billion cubic meters for use as fuel were the Soviet Union, Canada, Romania, and possibly Venezuela. Moscow is now sup-

plied with natural gas by a 530-mile pipeline from Saratov on the lower Volga.

The United States has ample supplies of natural gas to last for years. In 1948 and again in 1949 new discoveries and revisions of existing reserves were more than double the production of natural gas for the year, Dr. Parsons declares. "It is not widely realized that in equivalent heat units the proved and recoverable reserves of natural gas exceed proved petroleum reserves by a substantial margin."

Texas, Oklahoma and Louisiana contain the largest American known reserves. These three states together are responsible for 71% of the total production for 1949. Transportation is entirely by pipeline. Giant pipes are carrying Texas Panhandle gas to the Great Lakes area. Lines from southern Texas are supplying the East as far as New York City and will soon extend into New England.

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MEAT TENDERIZER from papaya is available in "tea bag" style of envelope for easy use in the home. One bag in a glass of tepid water makes enough material to tenderize 40 pounds of meat and does so at a cost of less than a cent per pound of meat.

Science News Letter, August 5, 1950

BICYCLE HEADLIGHT, automobile sealed-beam type, throws a block-long beam of light through a clear lens which gives a narrow beam like that of a giant flashlight. It operates in a case with either three or six regular flashlight batteries.

Science News Letter, August 5, 1950

VINYLITE PLASTIC tablecloths are colorfully printed with the appearances of fine block linen. No ordinary washing is needed as they can be easily cleaned with a damp cloth. No ironing is needed and they are available in seven colors.

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SHRIMP CLEANER, to remove the body from the shell, has a plastic handle which tapers to a point. This point is inserted under the shell at the vein hole, as shown in the picture, and thrust straight



back to separate the shell from the meat so that the shrimp can be rolled out.

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COVER FABRIC for presses used by the dry cleaner is made of asbestos blended with cotton and rayon. Because of the natural heat-retaining qualities of asbestos, the fabric offers a superior finishing surface.

which results in quick drying and no shine on the clothing.

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STREET LIGHTING recorder, for measuring street illumination, is an "electric eye" on wheels that trails an automobile and sends light intensity information to a registering device in the car. Accurate measurements of various amounts of light along the road can be taken at speeds up to 20 miles an hour.

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IMPROVED HECTOGRAPH is designed for office, school or home use, and will turn out 100 copies of typed or written pages at a single run. The gelatin used is chemically treated to assure clean and clear copies. Special hectograph carbon sheets and writing ink come with the device.

Science News Letter, August 5, 1950

GLASS REINFORCED paper contains continuous glass fibers swirled between two plies of kraft and then bonded under heat and pressure within waterproof outside layers. This tough, strong, non-deteriorating product has uses ranging from packaging to covering haystacks.

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Do You Know?

Stuttering occurs in about 1% to 2% of the population.

A person weighing 150 pounds on earth would weigh 24 pounds on the moon.

Christopher Columbus found West Indians playing with rubber balls made directly from latex, the milky sap of rubber plants.

Nearly one-third of the victims of lightning are persons taking shelter under isolated trees during lightning storms.

When cows are switched from hard water to an aerated soft water, milk production greatly increases, it is claimed.

Venezuela, seven times the size of New York State, has 5,000,000 people but land enough to support easily some 45,000,000.

Porcupines are fair swimmers; because of their hollow air-filled needles and their plump bodies they float high in the water.

City folks are in less danger of lightning than rural people; the steel frames of tall buildings act as lightning conductors.

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